recent newsletter of the Dorset Naturalists' Trust: "It is so easy to keep a bird off its nest a little too long, tread on a rare plant, or even sit down on a most important caterpillar without in the least realising what one is doing". It is also easy to start a fire.

(c) No species is exempt from this danger. At Badbury Rings the most affected are *Argynnis aglaia* L. and *Hesperia comma* L.

9. (a) Myxamatosis. This disastrous epidemic has upset the balance of nature; lepidoptera and entomologists have suffered from its consequences as well as foxes and buzzards. Rabbits used to control the growth of coarse grasses and other rank vegetation, including seedling bushes, especially hawthorn, and prevent the smothering of less vigorous growths such as the Leguminosae which are the food plants of *Leptidea sinapis* L. and most of the Lycaenidae.

(b) Hod Hill, Ridge Copse (near Fareham).

(c) Hod, see 5 (c): Ridge, *Nola albula* Schiff., *Acosmetia caliginosa* Hübn.

10. (a) Ploughing up of grassland.

(b) Winspit (Purbeck), Homerton, Camp Hill and Coombe Bissett (near Salisbury).

(c) Lycaenidae.

I have not mentioned the part played by birds. Prof. Willmer considers them the main culprits. He points out that the number of birds of prey has been greatly reduced, directly by shooting, and indirectly by insecticides, and that as a result the number of small birds, especially starlings, has increased. Unfortunately it is only too true that birds of prey, especially sparrow hawks, have become very scarce, and starlings excessively abundant. The only other birds that seem to me to have become more plentiful during my lifetime are jackdaws and magpies. Both these birds are determined egg-stealers, and I have heard from reliable sources that jackdaws played a big part in exterminating the chough in Cornwall and very nearly doing so to the Kite in Central Wales. By robbing the nests of smaller birds they would have tended to benefit the butterfly population, even if starlings, a pantophagous crowd, are harmful to it. Have the small birds that are almost entirely insectivorous really increased in number? Swallows have certainly decreased, and our resident species, especially the wren, the Dartford warbler, and the song thrush, were badly hit by the exceptionally severe winter of 1962-3. I believe that the number of small insectivorous birds has not increased, but that their feeding grounds have been restricted and this has led to more intensive hunting by the birds and less chance of survival by the insects.

A 1958 Survey of the Butterflies of Blackmoor Copse Nature Reserve

By I. R. P. Heslop, M.A.

I. INTRODUCTORY NOTE

In 1958 I wrote for the Society for the Promotion of Nature Reserves a Survey of the butterflies of Blackmoor Copse which has not previously been published with the exception of the notes on one species, and which

with the same exception I am reproducing hereunder exactly as originally written. The material therefore will now not only be accessible for reference, but will fu nish a standard for subsequent comparisons. The exception alluded to is the Purple Emperor, all the material in connection wherewith (far exceeding that of all the other species together) was in fact published in substance in 1964 as portions of my joint monograph of the species, *Notes and Views of the Purple Emperor* (Southern Publishing Co., Brighton): though without any mention of Blackmoor Copse by name.

Blackmoor Copse, Wiltshire, previously and for many years privately fostered by myself, became on my recommendation and after prolonged negotiation the freehold property of the Society and a formal Reserve on 14th December 1956 with myself as Secretary of the Local Committee and acting Chairman. Reports by myself were published in the Society's Annual Report up to the time when, on changing my place of employment, I regretfully relinquished the positions of Secretary and Warden in 1961.

It will be observed hereunder that it was found possible to include 50 species of butterfly as occurring in Blackmoor Copse between 1940 (approximately) and 1958 (inclusive). This total appears to be surpassed during the present century only by the neighbouring Whiteparish Common (the integrity of which I successfully defended in court in 1959), Monkswood in Huntingdonshire, Great Breach Wood in Somerset (now much altered in character), and one of the grounds in the weald of West Sussex.

I am grateful to the Society for permission to publish this material here.

"Belfield", Burnham-on-Sea, Somerset.
18th July 1967.

II. THE 1958 NOTES ON THE SPECIES

Pieris brassicae Linn. (Large Garden White). Common everywhere, sometimes running to a very large size.

Pieris rapae Linn. (Small Garden White). Common.

Pieris napi Linn. (Green-veined White). Common.

Pontia daplidice Linn. (Bath White). Occurred here in 1945.

Euchloe cardamines Linn. (Orange-tip White). Common.

Leptidea sinapis Linn. (Wood White). At one time the Wood White had several stations in the South Wiltshire woods including Bentley Wood (not necessarily Blackmoor) and Whiteparish. It became extinct in all these grounds at about the same time that it disappeared from the New Forest (i.e., about 1900), except in Whiteparish where it lingered into the 'twenties.

In 1945 my wife and I saw two specimens in Whiteparish, catching (and releasing) one of these for assurance of identification. In 1956 one of my children took a specimen in the same wood.

In 1957, Mr. R. E. Haskell, Mr. J. M. Harris and myself each made separate and independent observations of the Wood White in Blackmoor (a single specimen in each case).

I regret that, despite the hopes entertained in the past, there was no observation of this species in the Reserve or its vicinity in 1958. It must be remembered, however, that the continuous unfavourable weather both curtailed flight time and hampered observation, in all species.

The Wood White's principal foodplant, the Tuberous Pea (*Lathyrus*

montanus) is scarce in the area (in fact I am not sure that I have seen this plant actually in Blackmoor), but the species feeds also on Tufted Vetch (*Viccia cracca*), which exists in quantity in the Reserve and its vicinity, and probably on other woodland vetches as well. It certainly feeds also on Bird's-foot Trefoil (*Lotus corniculatus*): so that, if it has (as I suspect) succeeded in establishing a station from which it can reach these two woods, this may be a downland one—as is quite normal for this butterfly in Devon and Cornwall.

It is to be noted that the western race (for which Wiltshire is the most eastern terrain) of the Wood White is noticeably distinct in appearance and season from the south-eastern race (e.g., as occurring in Surrey). There must be ecological differences as well, but as regards Wiltshire we have scanty data.

In woodland localities both in Sussex and Somerset the species appears to prefer tangled and overgrown rides or sometimes even tunnel-like cavities under the canopy. Conveivably, therfore, the over-growing of the rides in Blackmor may have favoured this species (if not here of downland origin); though this possibility must not interfere with the necessity of having the rides open and clean in the interests of the Purple Emperor.

Colias hyale Linn. (Pale Clouded-yellow). The occurrence of this migratory species so far west is periodic only. It has not been observed in the environs of Blackmoor since 1945 when it was numerous in the meadows on the fringe of the wood. I took one on Pepper Box Hill in 1955.

Colias croceus Fourc. (Common Clouded-yellow). Occurs in the area, in greatly varying numbers, in one year out of three on the average. In 1947 it was the commonest butterfly in the wood, occurring even in the deepest recesses and continuing into December. The winter of 1947-48 was a nominal one only and was succeeded by an early and maintained spring; with the result that a small stock of the species was enabled to overwinter in the chrysalis stage—an almost unprecedented event in England for this migratory species—and the butterfly was again on the wing in the spring of 1948 in this area.

Gonepteryx rhamni Linn. (Brimstone). Common. This year, and as has been noticed previously in the area, fresh specimens were out in early July *before* the hibernated examples had quite ceased to fly.

Argynnis paphia Linn. (Silver-washed Fritillary). Common. This year was the first in which I did not observe the beautiful black variety (*valesina*, the Dark Lady) in Blackmoor.

Argynnis cydippe Linn. (High Brown Fritillary). This has increased in numbers since the thinning of Blackmoor in 1948, and is now very common in the Reserve. It is the earliest of the large Fritillaries to come on the wing, normally on 24th June. This year the first specimen was seen on 7th July, and not another for several days afterwards. It is to be noted that the insect flies most commonly in the marsh area of the wood, greatly favouring the Marsh Thistle.

Argynnis aglaia Linn. (Dark Green Fritillary). At one time common in the wood. Since 1945 it has become progressively scarcer, but it still exists.

Argynnis euphrosyne Linn. (Large Pearl-bordered Fritillary). Common.

Argynnis selene Schiff. (Small Pearl-bordered Fritillary). Common.

Euphydryas aurinia Rott. (Marsh Fritillary). While the species occurred at several points in the Bentley Woods system (including Blackmoor) in the 'twenties; more intensive draining followed by several years of drought caused its total disappearance in the 'thirties. It reappeared in another part of Bentley Woods apparently about ten or twelve years ago. It has started to come back to Blackmoor since the drainage started to deteriorate during the last few years. Two or three specimens have now been seen in each of four years consecutively: 1955, 1956, 1957, and now 1958.

This year was so retarded that it was all the more pleasure to welcome the species when it made its first appearance in Blackmoor on 16th June. Observations in the Reserve extended into the first days of July—by far the latest date anywhere of which I have record. This year also it was observed that the Marsh Valerian had established itself in the marshy area of the Reserve. This is a very valuable subsidiary foodplant for this species.

Consequent upon the damper conditions there has been a huge revival of the principal foodplant, Devil's-bit Scabious (*Scabiosa succisa*) in Blackmoor. This plant here may be of a marshland strain, and is certainly much more luxuriant than the form growing on open downlands.

Drainage must be tackled in a large part of Blackmoor for the sake of the Purple Emperor butterfly. But I am most strongly of the opinion that, for the sake of the Marsh Fritillary (and other species), a certain area of Blackmoor—which I am prepared to indicate precisely—must be left completely undrained.

The ecological requirements of the Marsh Fritillary are very difficult to analyse. There is also a definite tendency for colonies to migrate: some are actually peripatetic, apparently quite independently of any considerations of suitability of site. No species is so subject to making local forms, and in some cases this may be the result of difference of habit. There are great fluctuations in the numbers of even comparatively fixed colonies: but there appears to be no doubt that there is a tendency for the species to become both scarcer and more localised in the United Kingdom than formerly.

The late Mr. S. G. Castle-Russell carried out field experiments, on a large and prolonged scale, with the object of working out the requirements of this puzzling species. His results were inconclusive.

The March Fritillary is by no means confined to marshy ground. Some colonies inhabit high downland. Both in Wilts. and in Somerset there are woodland colonies. Mr. Castle-Russell was convinced that the essential feature was a sharp slope, if only a low one, to give the larva (which is very active) refuge from accumulations of surface water.

Polygonia c-album Linn. (Comma). This species is numerous in the Reserve every year. Here its foodplant appears to be nettle, and there is nothing abnormal in the race. In contrast, at Whiteparish, only four miles away, the species took for some years to feeding on Sallow: thereby producing a particularly large and handsome form which, however, appears now to have died out. The species is endemic here; that is, its occurrence is not dependent on the expansion of territory that has occurred in the last 35 years. Incidentally, the note of the occurrence of

this species here in the early 'twenties, at page 141 of "The Entomologist" for June, 1930, is my first published one—though not by its name—in relation to Blackmoor.

Aglais urticae Linn. (Small Tortoiseshell). Common. It is a token of the extreme nature of the weather that, for the first time in my experience, this year specimens of the *first* brood showed a tendency to seek quarters for hibernation.

Nymphalis polychloros Linn. (Large Tortoiseshell). There is considerable evidence that since this, our rarest resident British species, abandoned its principal colony in Suffolk, it has been trying to establish a new colony in the area within a radius of 15 miles from the edges of Southampton Water. The sparse Sussex colony is stable. The separate Somerset and Dorset colonisations appear to have failed.

It has appeared in or near Blackmoor in each year from 1954 inclusive: usually only one specimen has been seen in a year, but last year, 1957, one was seen in Blackmoor in the spring and another in July. This year, on 6th August, I saw one in Mr. Haskell's garden. In 1956 several specimens were seen in the vicinity of Pepperbox Hill and Whiteparish; and one at Coombe Bissett.

The foodplants, apparently equally favoured, are Salix (Sallows and Willows) and Ulmus (Elm). But there appears to me to be some indication that the species cannot maintain itself permanently in a locality where *both* genera of trees do not exist in reasonable numbers. I would therefore advocate the planting of some elms on the fringes of the Reserve.

Nymphalis antiopa Linn. (Camberwell Beauty). Observations, by members of a shooting party of General Fanshawe's, of a certain butterfly in the Reserve in early October 1957, can relate only to this species.

Nymphalis io Linn. (Peacock). Common.

Vanessa cardui Linn. (Painted Lady). Occurs here in most years, and is common here when it is common elsewhere.

Vanessa atalanta Linn. (Red Admiral). Usually common.

Limenitis camilla Linn. (White Admiral). Common. This is another species of which, by tradition in the New Forest, the first appearance on the wing is usually associated with Midsummer Day (24th June). And as in the other case, that of the High Brown Fritillary, this species also was first seen in Blackmoor this year on 7th July.

Hampshire, Sussex and South Wilts. have always constituted the hard core of this species's distribution; and it seems likely that in our woods the species will not be affected by the recession that appears to have set in during the last few years from the extreme limits of expansion (e.g., Devon, South Wales, Salop, Nottingham) that were reached about 1945.

There is a distinct tendency for the species to "throw black" both in Blackmoor and in Whiteparish.

When we coppice portions of Blackmoor in rotation we must be careful to disturb the honeysuckle as little as possible.

Apatura iris Linn. (Purple Emperor). [See Introductory Note.]

Melanargia galathea Linn. (Marbled White). Common, even in the depths of the woodland.

Pararge aegeria Linn. (Speckled Wood). Common.

Pararge megera Linn. (Wall Brown). Consistently present, but sparse.

Eumenis semele Linn. (Grayling). A nice woodland form used to occur in both Whiteparish and Blackmoor, but has not been observed in the Reserve since 1945. I am informed that the species still occurs in

Alderbury Woods; but there it may be of a form proper to the heath which was once prevalent there and of which vestiges still remain.

Maniola jurtina Linn. (Meadow Brown). Abundant.

Maniola tithonus Linn. (Gatekeeper). Common.

Aphantopus hyperanthus Linn. (Common Ringlet). Common.

Coenonympha pamphilus Linn. (Small Heath). Occurs sparsely in one or two locations in the Reserve.

Hamearis lucina Linn. (Duke of Burgundy). At one time occurred freely in the south-eastern portion of Blackmoor as an overflow from its principal breeding ground which was where the forestry quarters now stand. Now its occurrence is confined to single specimens, which still however occur each year. The species is still well distributed in Bentley Woods proper.

Thecla betulae Linn. (Brown Hairstreak). (See below.) Has not been observed recently; but is always difficult of observation, and probably still occurs.

Thecla quercus Linn. (Purple Hairstreak). Very common. Here it has an exceptionally long flight season, sometimes extending to two months. A few females were caught in 1958, outside the Reserve, for experimental breeding.

[*Strymonidia pruni* Linn. (Black Hairstreak). I am quite convinced that this scarce and very local butterfly has a station fairly close to this wood system. It is necessary for us, therefore, at least not to interfere with conditions which are suitable to its existence or natural colonisation. These are at the moment apparently entirely favourable in a large part of the Reserve.

The nearest *known* substantial colony of this species is near Oxford. But it has during the present century been reported from Newbury, west Surrey, and Southampton. Finally, a specimen was taken a few years ago in Whiteparish Wood—only four miles from Blackmoor.

The Black Hairstreak larva likes mature and lichenous Blackthorn bushes, in thickets, over a fairly dry floor. These conditions are still fulfilled in Blackmoor. Actually, the most likely-looking brake (from which incidentally I obtained Brown Hairstreak larvae some years ago—the only time I have seen that species in the wood) was the one at the southern tip of Blackmoor. This is now largely destroyed by the intrusive power-line; and by the cutting-back of "scrub" as a necessary safety precaution at this corner. There are other quite suitable clumps.

The imago likes *narrow* rides (in contrast to the Brown Hairstreak which prefers open clearings); and there is no shortage of the flowers which it normally frequents.]

Strymonidia w-album Knoch (White-letter Hairstreak). Present but scarce. One or two specimens are seen in most years. The foodplants, species of Ulmus, are scarce in the vicinity.

Callophrys rubi Linn. (Green Hairstreak). Often common, but subject to considerable fluctuations in numbers.

Lycaena phlaeas Linn. (Small Copper). Common.

Aricia agestis Schiff. (Brown Argus Blue). Occurs sparingly.

Polyommatus icarus Rott. (Common Blue). Common.

Lysandra coridon Pod. (Chalk-hill Blue). Occurs occasionally in the fringes of the wood, just as it does at Whiteparish.

Lysandra bellargus Rott. (Adonis Blue). Used to occur in the meadow, now the property of General Fanshawe, adjoining the Winterslow Road; but I have not seen it for a number of years.

Celastrina argiolus Linn. (Holly Blue). Occurs sparingly.

Cupido minimus Fuessl. (Small Blue). Occurs freely on banks and in cuttings quite close to the Reserve: and so, in good years, occasionally and sparingly in the meadows bordering it.

Pyrgus malvae Linn. (Grizzled Skipper). Common.

Erynnis tages Linn. (Dingy Skipper). Common.

Thymelicus sylvestris Pod. (Common Small Skipper). Common.

Thymelicus lineola Ochs. (New Small Skipper). Probably quite common. Exists among the population of "small Skippers", but cannot be recognised without capture. This species was not known to be English until about 1890, when it was recognised in the marshes of the Thames Estuary. For a long time thereafter it was thought to be confined to Kent and the Fenlands. But I myself discovered and recorded it as follows: in 1926 in Hampshire and Hertfordshire; in 1927 in Surrey; in 1928 in Dorset and South Wilts.; and in 1929 in Somerset. All these observations, the results of a deliberate investigation, were recorded in "The Entomologist". It has since been found to occur in most of the south-midland and east-midland counties. Quite recently it was observed to be common on Pepper Box Hill; and it has also been reported near Westbury.

A test count by myself, in a rough pasture at East Grimstead in 1957, revealed it in the proportion of 1 to 5 to the other species of Thymelicus. In 1957, of three specimens caught casually at one spot in the Reserve (and subsequently released) one was *lineola*: it probably therefore exists there in much the same density as at East Grimstead.

Ochlodes sylvanus Esp. (Large Skipper). Common.

Hesperia comma Linn. (Silver-spotted Skipper). Reported by the late Major S. Maples from a field bordering the wood (probably the one which is now General Fanshawe's) in 1942, but not observed since.

Lepidoptera at Heversham

By Gaden S. Robinson

(concluded from page 278)

STATISTICS:

The total sample of 7,767 macrolepidoptera comprising 233 species was analysed in relation to the logarithmic series and Index of Diversity (q.v. Fisher, Corbet and Williams, 1943). The average number of individuals per species was 33·33 and the parameter x in the series was therefore 0·9942. This gave an index of dirersity (α) for the sample of 45·32 and a theoretical figure for n_1 (the number of species in the sample represented by only one specimen) of 45·06. The figure for n_1 actually observed was 37. For n_2, the number of species represented by two specimens, the theoretical figure was 22·4; that observed, 17. The calculations were continued for further values of n and the results tabulated on following page: